co-operated in developing a new type of rectifying and purifying machine. By July, 1918, the production of helium in moderate quantities was accomplished, and from that time onward the possibility of securing large supplies of helium was assured.

Concurrently, all practical details of the production of helium-borne airships and of the navigation of this type of craft were developed by the airship production section of the Navy. At the same time, under the direction of Prof. McLennan, plans were prepared and steps taken to erect and equip a station for purifying the helium which might become contaminated in service. Experimental investigations were also initiated with the object of developing the possible technical and scientific uses of helium. In particular, balance and spectroscopic methods for testing the purity of the gas were worked out, studies on the relative permeability of balloon fabrics to hydrogen and helium were commenced, and experiments were begun to exploit the use of helium in gas-filled incandescent lamps, gas-filled arc lamps, and thermionic valves. The equipment provided for the purification of contaminated helium in large quantities supplied the major portion of the apparatus required to liquefy helium, and arrangements were therefore made to produce this gas in a liquid form.

The advances already made by the time the Armistice commenced warrants the opinion that at the end of another year large supplies of helium would have been produced within the Empire at a low cost, helium-filled aircraft would have been in service, and great progress would have been made in exploiting the technical and scientific uses of this gas.

Before the war a proposal to utilise helium as a filling for airships would have been viewed, even by men of science, as akin to a proposal at the present time to pave the Strand with diamonds. Thanks, however, to the enterprise, enthusiasm, and initiative of the Navy, backed by imagination, a suggestion—at one time considered to be chimerical—has to-day become a realisation.

BIRDS AND THE WAR.

WITHIN the limits of a short article it is not possible to do justice to our feathered friends. The services rendered by homing-pigeons to the Army, Navy, and Air Forces have been invaluable, and numerous stories of their gallantry and devotion, under fire and even when wounded, have already appeared in the daily newspapers. Canaries, long recognised as the miners' friends in detecting the presence of poisonous underground gases, have played their part in the war by being used in the trenches and dug-outs when the presence of German poison-gas was suspected. It is not so generally known that parrots, in the earlier days of the war, were employed on the Eiffel Tower to give warning of the approach of enemy aircraft. Sea-gulls, on more than one occasion, betrayed the presence of submarines and mines and thus prevented disaster to our sailors.

On the actual battlefield the behaviour of birds has been remarkable. Unperturbed by the terrible racket and the bursting of gas-shells, a nightingale trilled its sweetest, a soaring skylark poured out its song, a blackbird sang the more merrily the heavier the bombardment, swallows twittered around, and nested in, the battered ruins of Ypres Cathedral even when it was under fire; a "minnie-shell," which burst in the middle of a covey of partridges, did not alarm them and they went on feeding unconcernedly a few seconds later. In fact, it may be said that the birds, wherever they could eke out an existence, seemed oblivious to the life-and-death struggle going on all round them.

At home the consensus of opinion of trustworthy observers shows that birds were at first much upset by air raids. As these, however, became more frequent, their fears diminished. There can be little doubt that birds are adaptable creatures, and soon become accustomed to loud noises. As an example of this, it may be stated that when the bells of St. Paul's were rung, after a protracted silence, to celebrate "Armistice Day," the City pigeons, long unaccustomed to such sounds, appeared to be seriously alarmed, though in days of peace they paid no attention to the daily chimes.

The restrictions on food, imposed on all loyal citizens, made it an offence to feed birds and prosecutions ensued. A sportsman was fined for feeding pheasants on grain, and more than one kind-hearted person paid the penalty for feeding birds on scraps. Cage birds were difficult to keep, and never were parrots more freely offered on loan to the Zoological Gardens.

The strenuous orders issued to farmers to plough up the maximum amount of their land was followed by a misguided outcry against all birds. Thanks to the efforts of the Royal Society for the Protection of Birds, and a few reasonable ornithologists, the agriculturists were persuaded that, after all, the majority of birds do more good than harm. There are, however, several enactments made against birds (such as the extension of the period for burning heather, the prolongation of the shooting season for grouse and blackgame, and the "Destruction of Pheasants Order") which, it is to be hoped, will shortly be modified or repealed.

Reports are not yet to hand as to how birds fared in enemy countries; probably they were no better off than they were in Great Britain. Such items as have evaded the strict German censorship, regarding the shortage of food, tell us that rooks were sold and eagerly bought as articles of diet. It is amusing to note that a correspondence, carried on in one of our leading daily newspapers, as to the edibility of gannets, gulls, etc., was ingeniously interpreted by the German newspaper-men as showing that England was starving owing to the invincibility of the U-boats.

Migration does not appear to have been

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affected; doubtless the travelling birds would be flying too high above the tumult of the battlefields to notice it and, even if they encountered a "barrage," they could always "rise to the occasion." Before aeroplanes became as common as they did towards the end of the war, birds were considerably excited by them. Gulls and wildfowl were observed to flee before them in panic-stricken rout, but on one occasion a flock of gulls is reported to have flown inquisitively after a seaplane. Incidentally, it may be noted that some interesting observations were made by our aviators as regards the height at which birds fly when on migration.

Perhaps the greatest effect of the war on bird-life in general will prove to be the lack of forests and woods. The abnormal felling of timber which has been carried out during the war must have an effect on arboreal birds for many years to come. The presence of the great spotted woodpecker in new areas in Scotland has already been announced, and is attributed to the fact that former haunts have disappeared under the axe. Owing to the absence of our gamekeepers an undeniable increase in "vermin" is widely reported. Jays seem to have been particularly numerous and widespread lately, and buzzards have been seen in many an unaccustomed place. But the benefits accruing from the lack of gamekeepers are not likely to be enjoyed for long.

Enough has been written to show that the subject of "Birds and the War" is one which demands more than a short article. I have compiled a book, now in the printers' hands, which deals (I think as fully as is at present possible) with the whole subject. Though I do not claim that my book attains finality, I trust that it may prove of some use to ornithologists, and also be of general interest; in any case, I offer it as a tribute to our friends the birds.

HUGH S. GLADSTONE.

PROF. G. CAREY FOSTER, F.R.S.

PROF. GEORGE CAREY FOSTER, whose death, on Sunday, February 9, at the age of eighty-three, we announced last week, was born at Sabden, in Lancashire. He received his education at University College, London, after which he proceeded to the Universities of Ghent, Heidelberg, and Paris. Carey Foster had held many official positions. He was appointed professor of experimental physics at University College at the age of thirty, his chair ultimately becoming the Quain chair, under the endowment of Sir Richard Quain. For four years, from 1900, he held the office of principal of the college. He was a fellow of the Royal Society, and one of its vice-presidents during the periods 1891–93 and 1902–3. He occupied the presidential chair of the Society of Telegraphic Engineers (now the Institution of Electrical Engineers), and also of the Physical Society of London. He was a fellow both of the University of London and of University College, and an honorary member of the Jewish Historical Society and of the American Philosophical Society.

In the last years advancing age compelled Carey Foster gradually to relinquish his official positions and to retire more and more into his country home. To the younger generation he is therefore known only by name, yet he played a leading part in at least three important movements connected with education in London.

First, in the eighties of last century, efforts began to be made to bring about an achievement of the aims of the original promoters of the foundation of the college as a university. Carey Foster (in his own words) looked upon the college not only as an important place of education, but also as an important expression of a most remarkable intellectual movement—"a movement which stood for free inquiry and effort towards improvement, intellectual and social." Education, untrammelled by extraneous considerations, could not be obtained in the days when his college was founded. Owing to the vicissitudes which the scheme met with, the teaching and examining functions of the institution had become distinct, the former being vested in the college, while the latter were carried on by the University as a separate body. Carey Foster threw himself, heart and soul, into, if he did not actually lead, the movement for the re-establishment of a teaching University in London, so that its teachers might have freedom in their teaching, untrammelled by the examinations of a distinct institution. This movement led to the establishment of the present University, which, however, only partly realised the wishes of its first promoters. In order still further to realise these aims, the college ultimately (January 1, 1907) allowed itself to be swallowed up in the University in order that it might, if possible, work the necessary reforms from inside. Carey Foster identified himself with the movement from first to last.

Next, still further to carry out the idea of emancipation, he was a hearty supporter of the projects for the admission of women to university teaching and privileges. Such a change was inevitable. It was regarded, in some quarters, as a hazardous step. Its extension within the college and to other colleges and universities in England and abroad is a justification of the pioneer work of the college.

The third movement was concerned directly with the teaching of the subject of which Carey Foster was professor. He laid the foundation of the physical laboratory as it exists to-day. When he himself was educated, laboratory work, as we now know it, did not form part of any curriculum. But, about 1866, in two rooms in his college, he created the first physical laboratory, in which students might repeat the standard methods of measurement which were then being rapidly developed—especially on the Continent—and be taught the conditions for success in such measurements. Cabinets of physical apparatus had existed before, but these were intended for the illustration of lectures. The spirit of change was in the air,

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